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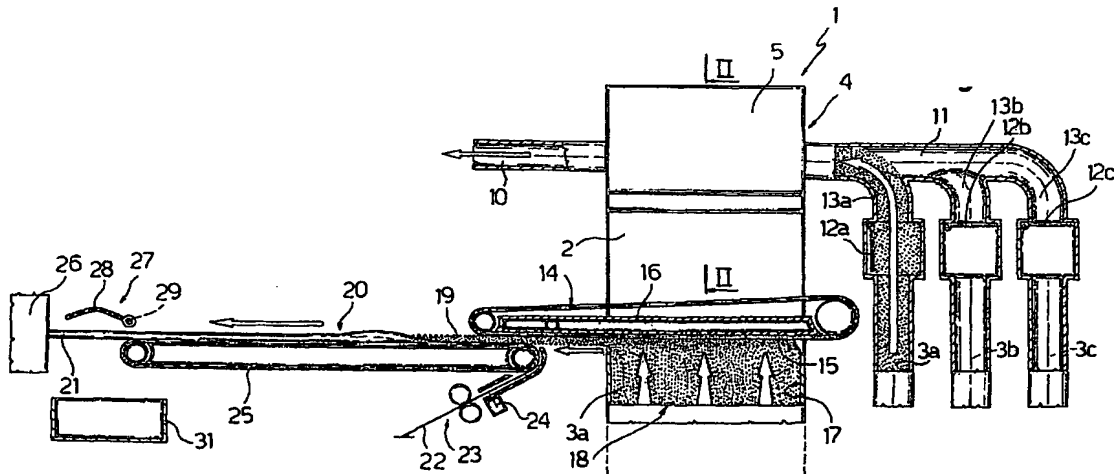
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(54) Title: PRODUCT CHANGE METHOD FOR A CIGARETTE MANUFACTURING MACHINE



(57) Abstract: A product change method for a cigarette manufacturing machine (1), wherein an input hopper (2) receives a first type (3a) of shredded tobacco from a supply header (4), and feeds it to at least one channel (17) for forming, on a conveyor (14), a bead (19) of tobacco, which is released onto a paper strip (22) travelling along a forming table (20) for forming a continuous cigarette rod (21); the method provides for cutting off supply of the first type (3a) of shredded tobacco to the header (4), emptying the header (4), cutting off communication between the header (4) and the input hopper (2), cutting off supply of the paper strip 15 (22), keeping the manufacturing machine (1) running to form a waste stream (30) of shredded tobacco of the first type (3a) and empty the manufacturing machine (1), and feeding a second type (3b) of shredded tobacco through the supply header (4) and the input hopper (2) to fill the manufacturing machine (1) completely before starting up supply of the paper strip (22).

5

PRODUCT CHANGE METHOD FOR A CIGARETTE MANUFACTURING
MACHINE

10 TECHNICAL FIELD

The present invention relates to a product change method for a cigarette manufacturing machine.

BACKGROUND ART

On cigarette manufacturing machines; product changes
15 are normally made by stopping the machine and clearing the various compartments of the machine either by hand or using external suction devices.

Which operations obviously involve relatively long machine stoppages and the use of skilled labour.

20 DISCLOSURE OF INVENTION

It is an object of the present invention to provide a product change method for a cigarette manufacturing machine, designed to eliminate the aforementioned drawback.

25 More specifically, it is an object of the present invention to provide a method of effecting a product change on a cigarette manufacturing machine substantially without stopping the machine.

According to the present invention, there is provided a product change method for a cigarette manufacturing machine, as claimed in Claim 1 and preferably in any one of the following Claims depending
5 directly or indirectly on Claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

10 Figure 1 shows a schematic side view, with parts in section and parts removed for clarity, of a cigarette manufacturing machine capable of operating according to the method of the present invention;

Figure 2 shows a section along line II-II in Figure
15 1;

Figures 3, 4 and 5 show a detail of Figure 1 in three different operating positions.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in Figure 1 indicates as a whole a
20 cigarette manufacturing machine comprising an input hopper 2 for receiving shredded tobacco 3 from a supply header 4, which in turn comprises a box 5 located on top of hopper 2 and fitted at the bottom with a shut-off valve 6 which, in the closed position, disconnects box 5
25 from input hopper 2. More specifically, valve 6 comprises a plate 7 hinged to a lateral wall 8 of box 5 and movable, by a known actuator (not shown) controlled by a level sensor 9 inside input hopper 2, between a vertical

open position, and a horizontal closed position in which plate 7 defines a bottom wall of box 5.

Header 4 also comprises a suction conduit 10 fitted through lateral wall 8 and connected to a known suction device (not shown) for producing a vacuum in box 5; and a feed conduit 11, the outlet of which communicates with box 5 through lateral wall 8, and the inlet of which communicates selectively, by means of three valves 12a, 12b, 12c, with respective feed conduits 13a, 13b, 13c for supplying respective different types 3a, 3b, 3c of shredded tobacco 3.

Manufacturing machine 1 also comprises a substantially horizontal conveyor 14 having a bottom branch 15, which extends beneath a suction box 16, and an intermediate portion of which closes the top end of an upflow channel 17 for a stream 18 of shredded tobacco 3 fed (in known manner not shown) to upflow channel 17 by input hopper 2 and for forming, on bottom branch 15, a bead 19 of tobacco retained by suction on conveyor 14.

In a variation not shown, manufacturing machine 1 comprises two or more conveyors 14 fed by respective upflow channels 17 connected, in known manner, in parallel to input hopper 2.

An output end of bottom branch 15 of conveyor 14 is located over a table 20 for forming a continuous cigarette rod 21 from a paper strip 22 - fed onto table 20 along a feed line 23 extending through a cutting station 24, and fed along table 20 by a conveyor 25 - and

from bead 19 of shredded tobacco, which is released onto paper strip 22 close to an input end of conveyor 25 and over cutting station 24. In the event a number of conveyors 14 are provided, forming table 20 is obviously
5 connected to an equal number of feed lines 23 supplying respective paper strips 22.

As shown in Figure 1, continuous cigarette rod 21 is fed by conveyor 25 to a known cutting device 26, for cutting continuous cigarette rod 21 transversely into
10 portions (not shown), via an intercepting device 27 comprising a powered deflecting member 28, which rotates about an axis 29 between a raised rest position, and a lowered work position in which deflecting member 28 directs the load on conveyor 25 downwards to form a waste
15 stream 30 which is fed into a bin 31.

Operation of manufacturing machine 1 will now be described assuming it is operating with shredded tobacco 3a to produce a given type of cigarette, and is to be switched over to produce a different type of cigarette
20 from a different type of shredded tobacco, e.g. shredded tobacco 3b.

During the normal production run using shredded tobacco 3a, valve 12a is kept open, valves 12b and 12c are kept closed, and valve 6 is normally closed, so that
25 the air sucked out along suction conduit 10 draws shredded tobacco 3a up into box 5 along feed conduit 11 to gradually fill box 5, which is only emptied into input hopper 2, by opening valve 6, when a low level of

shredded tobacco inside input hopper 2 is detected by level sensor 9. That is, shredded tobacco 3a is transferred in bulk from box 5 to input hopper 3 under the control of level sensor 9.

5 Once inside input hopper 2, shredded tobacco 3a is transferred, in known manner not shown, to upflow channel 17, which feeds it onto the underside of bottom branch 15 of conveyor 14 to gradually form, on bottom branch 15, bead 19, which is fed by conveyor 14 onto paper strip 22
10 fed continuously along forming table 20 and folded gradually crosswise about bead 19 to form continuous cigarette rod 21. That is, during the normal production run, paper strip 22 is fed continuously along feed line 23 and forming table 20, receives bead 19 of tobacco 3a
15 continuously, and is continuously folded crosswise to continuously form continuous cigarette rod 21, which is fed continuously beneath deflecting member 28, in the raised rest position, to cutting device 26.

Manufacturing machine 1 is switched over to a
20 different type of cigarette by first closing valve 12a to cut off supply of shredded tobacco 3a, stopping feed line 23, and simultaneously cutting paper strip 22 at cutting station 24 (Figure 3), while leaving the rest of manufacturing machine 1 running, so that all the
25 remaining shredded tobacco 3a is sucked into box 5, which is then opened, under the control of level sensor 9, to unload the remaining shredded tobacco 3a into input hopper 2 and so empty header 4 completely. At which

point, suction along suction conduit 10 is cut off.

At the same time (Figure 3), deflecting member 28 is moved into the lowered work position to direct the remaining bead 19 of shredded tobacco 3a, without relative paper strip 22, into waste bin 31. This operation continues (Figure 4) until manufacturing machine 1 is cleared completely, which may optionally be perfected automatically using compressed air jets in known manner not shown.

At this point, with the machine in the same configuration described above, but with suction restored along suction conduit 10, valve 12b is opened to feed shredded tobacco 3b directly into input hopper 2 (input hopper 2 is empty to begin with, so that plate 7 is kept in the vertical open position by level sensor 9) and afterwards only into box 5. By means of successive loads of shredded tobacco 3b, manufacturing machine 1 is filled completely with tobacco 3b to form a bead 19, which is fed, without relative paper strip 22, along forming table 20 and directed by intercepting device 27 into waste bin 31. Only when the correct compactness of bead 19 of shredded tobacco 3b is achieved, are conveyors 14 and 25 stopped and then started again, after feeding paper strip 22 along forming table 20, to form a new type of continuous cigarette rod 21, a first portion of which is again directed by intercepting device 27 into waste bin 30. Finally, deflecting member 28 is restored to the raised rest position to permit normal production of the

new type of cigarette using shredded tobacco 3b.

CLAIMS

1) A product change method for a cigarette manufacturing machine, wherein an input hopper (2) receives a first type (3a) of shredded tobacco from a supply header (4), and feeds it to at least one channel (17) for forming a bead (19) of tobacco, which is released onto a paper strip (22) travelling along a forming table (20) for forming a continuous cigarette rod (21); the method comprising the steps of cutting off supply of said first type (3a) of tobacco to said manufacturing machine (1); unloading the first type (3a) of shredded tobacco from the manufacturing machine (1) to form a waste stream (31) of shredded tobacco of the first type (3a); and feeding a second type (3b) of shredded tobacco through the supply header (4) and the input hopper (2) until the manufacturing machine (1) is completely full.

2) A method as claimed in Claim 1, wherein unloading the first type (3a) of tobacco comprises the step of arresting said paper strip (22).

3) A method as claimed in Claim 2, and comprising the further step of only starting up supply of said paper strip (22) when the manufacturing machine (1) is filled completely with said second type (3b) of shredded tobacco.

4) A method as claimed in any one of Claims 1 to 3, wherein the first type (3a) of tobacco is unloaded by

deflecting said bead (19) of tobacco into container means (31).

5 5) A method as claimed in any one of Claims 1 to 4, wherein the first type (3a) of tobacco is unloaded by deflecting said bead (19) of tobacco into container means (31) at an output end of said forming table (20).

10 6) A method as claimed in any one of Claims 1 to 5, wherein the manufacturing machine (1) is filled completely with said second type (3b) of shredded tobacco in successive loads; each load being formed inside said header (4) separated from said input hopper (2), and being unloaded into said input hopper (2) by connecting said header (4) to said input hopper (2).

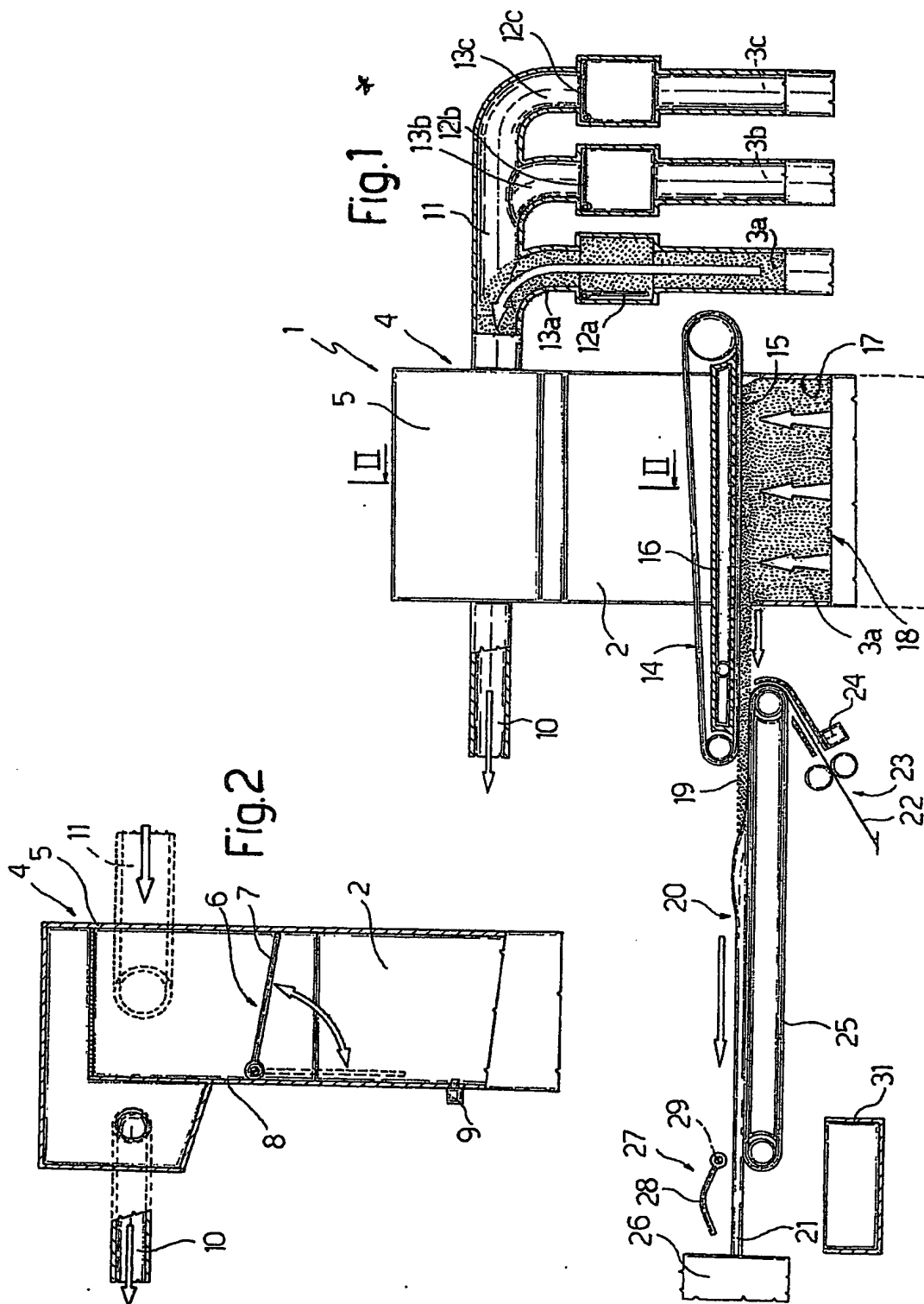
15 7) A method as claimed in any one of Claims 1 to 6, wherein the manufacturing machine (1) is filled completely with said second type (3b) of shredded tobacco by forming a bead (19) of the second type (3b) of tobacco along said forming table (20).

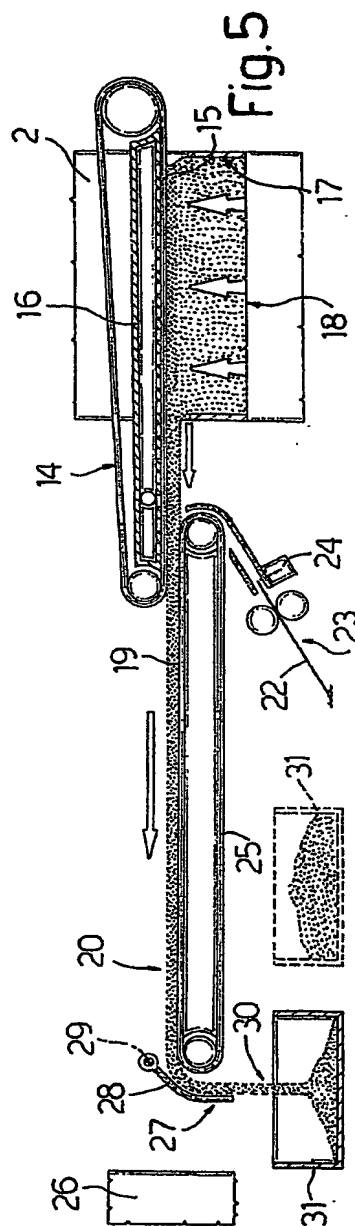
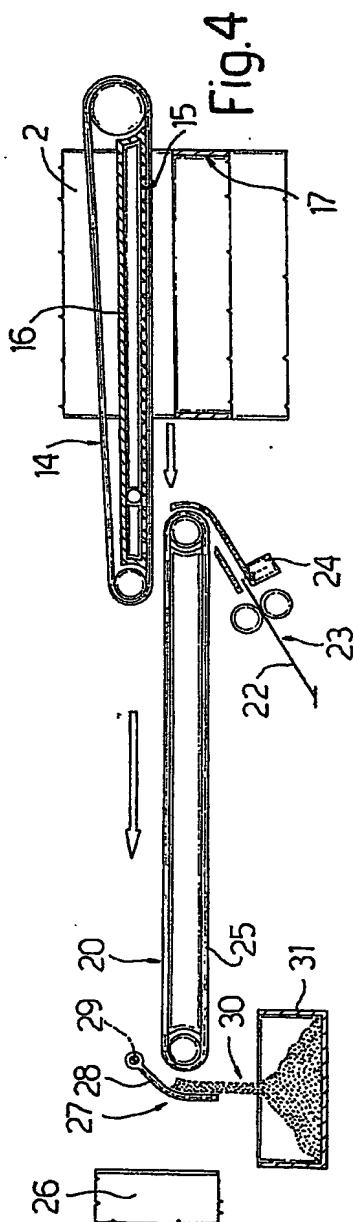
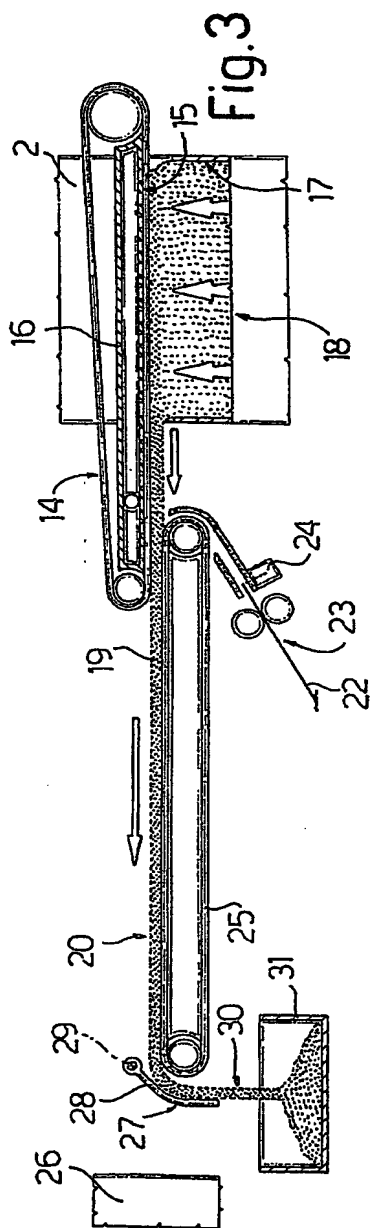
20 8) A method as claimed in Claim 7, wherein said bead (19) of the second type (3b) of tobacco is left without the relative paper strip (22) until a given desired compactness is achieved.

25 9) A method as claimed in Claim 8, wherein said bead (19) of the second type (3b) of tobacco, without the relative said paper strip (22), is deflected into container means (31).

10) A method as claimed in Claim 8 or 9, wherein said paper strip (22) is fed, with the bead (19) of the

second type (3b) of tobacco, along said forming table
(20) to form a new type of continuous cigarette rod (21);
an initial portion of said new type of continuous
cigarette rod (21) being deflected into said container
5 means (31).





INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A24C5/18 A24C5/39

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 952 077 A (IAN MELVILLE CLARK M A) 11 March 1964 (1964-03-11) figure 1	1
A	US 4 756 315 A (BELVEDERI BRUNO ET AL) 12 July 1988 (1988-07-12) figure 1	1
A	GB 2 088 693 A (SASIB SPA) 16 June 1982 (1982-06-16) abstract	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC1/EP 03/51004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 952077	A	11-03-1964	US 3059650 A	23-10-1962
US 4756315	A	12-07-1988	IT 1189915 B	10-02-1988
			BR 8700226 A	01-12-1987
			CA 1275222 C	16-10-1990
			DE 3701280 A1	23-07-1987
			FR 2593032 A1	24-07-1987
			GB 2185377 A ,B	22-07-1987
			IN 169131 A1	07-09-1991
			JP 2004750 C	20-12-1995
			JP 7038786 B	01-05-1995
			JP 62215378 A	22-09-1987
GB 2088693	A	16-06-1982	IT 1133550 B	09-07-1986
			BR 8107579 A	17-08-1982
			CA 1168126 A1	29-05-1984
			DE 3146087 A1	16-06-1982
			FR 2494565 A1	28-05-1982
			JP 1047148 B	12-10-1989
			JP 1566995 C	25-06-1990
			JP 57118783 A	23-07-1982
			US 4417594 A	29-11-1983